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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/791,049

03/02/2004

Xiaorong Wang

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EXAMINER

ASINOVSKY, OLGA

ART UNIT

PAPER NUMBER

1711

MAIL DATE

DELIVERY MODE

06/07/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/791,049

Applicant(s)

WANG ET AL.

Examiner

Olga Asinovsky

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 27 March 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) 1-9 and 18-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 10-17 and 23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 03/26/2007.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments, see Remarks, 1<sup>st</sup> paragraph, filed 03/27/2007, with respect to the rejection(s) of claim(s) 10 and 13 under 35 USC 112, second paragraph, have been fully considered and are persuasive. Since the chemical formulation of "mono-block and diblock polymer" is not critical in the present claims and the chemical formulation is given in the original specification, this rejection has been withdrawn.

### ***Claim Rejections - 35 USC § 103***

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 10-15, 17 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krom et al U.S. Patent 6,437,050 in view of Demirors et al U.S. Patent 6,441,090.

References have been considered in previous office actions mailed on 12/22/2006 and 06/20/2006. All discussions are equivalently set here.

In addition, Krom discloses a composition comprising a polymer of nano-particles having a dispersity index less than about 1.3, col. 2, lines 14-15. Krom discloses a diblock copolymer produced by living anionic polymerization, col. 2, lines 40-65. The polymer of nano-particles size has a core of polyalkenylbenzene and a polyconjugated diene surface layer to form diblock copolymer that is within the scope of micelle-like structure, column 3, lines 4-13. The anionic polymerization process is controlled such that after the micelles have formed, additional conjugated diene monomer or vinyl-

substituted aromatic hydrocarbon monomer=alkenylbenzene monomer (styrene) can be added to the polymerization mixture as desired, column 3, lines 13 and 16-18.

Therefore, if additional monomer is styrene, thus this step has advantage to create insoluble vinyl-aromatic block, column 3, line 13. The vinyl-aromatic block is mono-block in the present claims. Krom does disclose that insoluble vinyl-aromatic block in the polymerization solvent medium and diblock copolymer that are readable in the present claim 10 for being mono-block and diblock polymer. Krom discloses that the diblock polymer has molecular weight of about 5,000 to 200,000, column 4, lines 10-11. Krom discloses that the polymer nano-particles have a dispersity less than about 1.3, more preferably less than about 1.1, column 2, lines 14-15. The dispersity index of 1.3 or 1.1 is readable in the present claims 10 and 23.

Krom does not use term "polymodal" or "bimodal," or "trimodal." However, the broad range limitation of the molecular weight from 5,000 to 200,000 is the evidence that the polymer nanoparticles chains will not have equal  $M_w=M_n$  having ratio of  $M_w$  to  $M_n$  being 1.

Demirors discloses a rubber modified monovinylidene aromatic polymer having a bimodal rubber particle size distribution, column 6, lines 18-30.

Both references disclose analogous anionic polymerization process. It would have been obvious to one of ordinary skill in the art to consider that the polymer nano-particle composition in Krom invention has at least bimodal rubber particles following by teaching Demirors invention, since the desired bimodal rubber particle size distribution

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is depending on the techniques of mass-polymerization and the conditions process for producing the desired average particle sizes and the desired property of the resulting polymer composition, and since both references disclose the analogous anionic polymerization process. Otherwise, it would have been obvious to one of ordinary skill in the art to modify the polymer nano-particle composition in Krom invention by employing of the bimodal rubber polymer particles by teaching in Demirors invention, since both references disclose the rubbery formation unit and the analogous anionic polymerization process.

### ***Response to Arguments***

Applicant's arguments filed 03/27/2007 have been fully considered but they are not persuasive. Argument is that there is no reason to combine the teaching of Krom reference with Demirors because Krom teaches away from making the claimed combination. Applicants are referring to Krom that "nano-particles preferably are monodisperse in size and uniform in shape," column 1, lines 18-19 and column 2, line 11. Whereas, Demirors teaches a bimodal particle size distribution. The applicants' argument is not persuasive. Krom discloses the possibility and one of the variant of monodispersity wherein the ratio of Mw to Mn is 1, column 2, line 13. Krom discloses that "the polymer nano-particles of the present invention have a dispersity less than about 1.3, more preferably less than about 1.1," column 2, lines 14-15. The preferred dispersity less than about 1.1 in Krom invention is readable in the present claim 10 and claim 23 for being at least 1. Krom discloses that the diblock polymer has molecular weight of about 5,000 to 200,000, column 4, lines 10-11. The broad range limitation of

the molecular weight from 5,000 to 200,000 is the evidence that the polymer nanoparticles have a polymodal distribution. The term "polymodal" is referring to the nano-particles with a broad and controllable size distribution, see original specification at page 2, lines 20-23.

4. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Krom et al U.S. Patent 6,437,050 in view of Demirors et al U.S. Patent 6,441,090 as applied to claims 10-15, 17 and 23 above, and further in view of Coolbaugh et al U.S. Patent 5,399,629 or Wang et al U.S. Patent 6,689,469.

References have been considered in the previous office action mailed on 12/22/2006 and all discussion are equivalently set here.

Krom does not disclose hydrogenating of conjugated diene monomer units.

Coolbaugh discloses a selective hydrogenation of a thermoplastic block copolymer elastomer based on conjugated diene monomers by using a hydrogenation catalyst.

Wang'469 discloses a polymer nano-particle composition comprising a poly(alkenylbenzene) core-mono-block polymer and diblock polymer formed of vinyl aromatic hydrocarbon monomer and diene monomer. The polydiene units are hydrogenated, column 5, lines 6-14. The nano-particles have a polydispersity less than about 1.3, column 7, claim 9.

It would have been obvious to one of ordinary skill in the art to produce a hydrogenated polyconjugated diene chain in Krom invention by using a hydrogenated catalyst as

disclosed by Coolbaugh invention or Wang'469, since each reference discloses similar conjugated diene units and the same anionic polymerization process.

### ***Double Patenting***

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. Claims 10-17 and 23 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-18 of U.S. Patent No. 6,872,785 in view of Demirors et al U.S. Patent 6,441,090. The rejection is set forth in the office actions mailed on 12/22/2006 and 06/20/2006. All discussions at page 6 of the office action of 12/22/2006 and page 6 of the office action of 06/20/2006 are equivalently set here.

7. Claims 10-17 and 23 are rejected under 35 U.S.C. 103(a) as being obvious over Wang et al U.S. Patent 6,872,785 in view of Demirors et al U.S. Patent 6,441,090.

The applied primary reference to Wang'785 has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(I)(1) and § 706.02(I)(2).

In addition, Wang'785 discloses mono-block polymer, diblock polymer, and multi-block polymer having molecular weight between about 1,000 and 1,000,000, column 6, lines 17-24 and column 5, lines 46-50. Wang discloses a broad range limitation of the molecular weight of nano-particles polymer chains. It is reasonable to presume that polymer chains will not have equal  $M_w=M_n$ . Although Wang does not use word "polymodal" distribution, the meaning is that the nano-particles polymer chains will have



different size. The evidence in Wang'785 is that the polymer nano-particles have preferably a dispersity less than about 1.3, column 3, line 8.

Demirors discloses a rubber modified monovinylidene aromatic polymer having a bimodal rubber particle size distribution, column 6, lines 18-30, having a small rubber particles in the range of 100 to 200 nanometer and large rubber particles having range of from 500 to 1000 nanometer.

It would have been obvious to one of ordinary skill in the art to modify the polymer nano-particle composition in Wang'785 by employing the bimodal rubber polymer particles by teaching in Demirors invention, since both Wand'785 and Demirors inventions disclose the analogous anionic polymerization process and analogous chemical formulation of the nano-particles.

### ***Response to Arguments***

8. Applicant's arguments filed 03/27/2007 have been fully considered but they are not persuasive.

9. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, argument is that there is no motivation to combine the teachings of Demirors with Wang'785 since

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Wang'785 discloses "monodisperse" nano-particles. Demirors discloses a bimodal particle size distribution.

Upon reviewing the disclosure in Wang'785 at column 3, lines 5-7, it was found that "monodisperse" is represented by ratio of Mw to Mn with a ratio of 1. However, the invention is that a dispersity is less than about 1.3, more preferably less than about 1.2, and most preferably less than about 1.1, column 3, lines 8-10. The present claims 10 and 23 disclose a polydispersity index between about 1 and up to 10 (claim 10) and about 1.15 and 8.0 (claim 23). Polydispersity index of 1.1 in the present claims and Wang'785 is the same. The combination of teachings Wang'785 and Demirors is proper.

### ***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

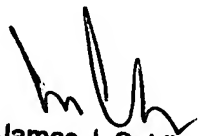
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Olga Asinovsky whose telephone number is 571-272-1066. The examiner can normally be reached on 9:00 to 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on 571-272-1078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

O.A.

June 01, 2007

  
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